congenital hemidysplasia with ichthyosiform erythroderma and limb defects

Congenital hemidysplasia with ichthyosiform erythroderma and limb defects, more commonly known by the acronym CHILD syndrome, is a condition that affects the development of several parts of the body. The signs and symptoms of this disorder are typically limited to either the right side or the left side of the body. ("Hemi-" means "half," and "dysplasia" refers to abnormal growth.) The right side is affected about twice as often as the left side.

People with CHILD syndrome have a skin condition characterized by large patches of skin that are red and inflamed (erythroderma) and covered with flaky scales (ichthyosis). This condition is most likely to occur in skin folds and creases and usually does not affect the face. The skin abnormalities are present at birth and persist throughout life.

CHILD syndrome also disrupts the formation of the arms and legs during early development. Children with this disorder may be born with one or more limbs that are shortened or missing. The limb abnormalities occur on the same side of the body as the skin abnormalities.

Additionally, CHILD syndrome may affect the development of the brain, heart, lungs, and kidneys.

Frequency

CHILD syndrome is a rare disorder; it has been reported in about 60 people worldwide. This condition occurs almost exclusively in females.

Genetic Changes

Mutations in the *NSDHL* gene cause CHILD syndrome. This gene provides instructions for making an enzyme that is involved in the production of cholesterol. Cholesterol is a type of fat that is produced in the body and obtained from foods that come from animals, particularly egg yolks, meat, fish, and dairy products. Although high cholesterol levels are a well-known risk factor for heart disease, the body needs some cholesterol to develop and function normally both before and after birth. Cholesterol is an important component of cell membranes and the protective substance covering nerve cells (myelin). Additionally, cholesterol plays a role in the production of certain hormones and digestive acids.

The mutations that underlie CHILD syndrome eliminate the activity of the NSDHL enzyme, which disrupts the normal production of cholesterol within cells. A shortage

of this enzyme may also allow potentially toxic byproducts of cholesterol production to build up in the body's tissues. Researchers suspect that low cholesterol levels and/or an accumulation of other substances disrupt the growth and development of many parts of the body. It is not known, however, how a disturbance in cholesterol production leads to the specific features of CHILD syndrome.

Inheritance Pattern

This condition has an X-linked dominant pattern of inheritance. A condition is considered X-linked if the mutated gene that causes the disorder is located on the X chromosome, one of the two sex chromosomes. The inheritance is dominant if one copy of the altered gene in each cell is sufficient to cause the condition.

Most cases of CHILD syndrome occur sporadically, which means only one member of a family is affected. Rarely, the condition can run in families and is passed from mother to daughter. Researchers believe that CHILD syndrome occurs almost exclusively in females because affected males die before birth. Only one male with CHILD syndrome has been reported.

Other Names for This Condition

- CHILD syndrome
- Ichthyosiform erythroderma, unilateral, with ipsilateral malformations, especially absence deformity of limbs

Diagnosis & Management

Genetic Testing

- Genetic Testing Registry: Child syndrome
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C0265267/

Other Diagnosis and Management Resources

- GeneReview: NSDHL-Related Disorders
  https://www.ncbi.nlm.nih.gov/books/NBK51754

General Information from MedlinePlus

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html

- Palliative Care
  https://medlineplus.gov/palliativecare.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html

Additional Information & Resources

MedlinePlus

- Health Topic: Skin Conditions
  https://medlineplus.gov/skinconditions.html

Genetic and Rare Diseases Information Center

- CHILD syndrome
  https://rarediseases.info.nih.gov/diseases/6039/child-syndrome

Educational Resources

- Boston Children's Hospital: Congenital Limb Defects
  http://www.childrenshospital.org/conditions-and-treatments/conditions/congenital-limb-defects
- Disease InfoSearch: CHILD Syndrome
  http://www.diseaseinfosearch.org/CHILD+Syndrome/1331
- MalaCards: child syndrome
  http://www.malacards.org/card/child_syndrome
- Orphanet: CHILD syndrome
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=139

Patient Support and Advocacy Resources

- Foundation for Ichthyosis and Related Skin Types (F.I.R.S.T.)
  http://www.firstskinfoundation.org/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/ichthyosis-child-syndrome/
- Resource list from the University of Kansas Medical Center: Limb Anomalies
  http://www.kumc.edu/gec/support/limb.html

GeneReviews

- NSDHL-Related Disorders
  https://www.ncbi.nlm.nih.gov/books/NBK51754

ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22congenital+hemidysplasia+with+ichthyosiform+erythroderma+and+limb+defects%22

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28congenital+hemidysplasia+AND+ichthyosiform+erythroderma%5BTIAB%5D%29+OR+%28child+syndrome+AND+NSDHL%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D

OMIM

- CONGENITAL HEMIDYSPLASIA WITH ICHTHYOSIFORM ERYTHRODERMA AND LIMB DEFECTS
  http://omim.org/entry/308050

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